A COMPARISON OF GROUPS OF VISUALLY HANDICAPPED CHILDREN FOR ABILITY TO READ TYPE OF TWO DIFFERENT CHARACTERISTICS

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INTRODUCTION:

Books printed in large type are required by a number of children in this country. This population of visually-handicapped children is quite heterogeneous in regard to visual disability, visual acuity and other characteristics. It is not possible to mass produce large type textbooks which meet the visual requirements of every child in this group. However, it does seem possible to produce texts that will meet the visual requirements of the majority of these children.

A number of characteristics of large-type books should be studied to determine which are best suited to the majority of children. Among these are illustrations, paper color, and for printing -- type size, type face, leading and line length. The present study concerns two characteristics of type: face and size.

Appropriate type size for large-print texts has long been a subject of debate. As a result of studies and surveys (1, 2, 4) varying conclusions have been reached. While the possibility of general use of 36-point type has been ruled out, findings do not clearly demonstrate whether 24-point type or 18-point type is best. This is one question to be explored in this study.

General agreement exists that bold type is most suitable. Since most large type books are reproduced from regular school books through photo-offset printing, the type faces employed are those regularly used in school books. Little evidence exists on the comparative usefulness of these types or other types for visually handicapped children. In a recent paper (5), Prince has described a type face which appears to be more legible than common schoolbook types. Whether visually-handicapped children can read this type faster than common types is a second question to be explored in this study.

PROCEDURE:

Subjects: The groups consisted of 264 children of both sexes, grades 4-12, ages 8 years 9 months - 20 years 10 months, who had I.Q's of more than 69, or who were not judged severely retarded in reading by their teachers. These children were enrolled in forty-seven public schools with sight-saving classes and three residential schools for the blind in Ohio, Illinois and Kentucky. All children were currently reading 18-point type size or greater. Testing was state-wide in Ohio and Illinois with the exclusion of the Chicago and Cleveland school systems. In Kentucky children were tested only in Louisville.

One-hundred-thirty-two of the children tested were legally blind with vision in the better corrected eye ranging from 20/200 to 2/200. The remaining one-hundred-thirty-two children had vision ranging in the better corrected eye from 20/20 to 20/160.

Children at each visual level were divided into four experimental groups. This was done by listing children alphabetically by grade and school, and alternately assigning them to each of the four groups. Comparisons of the eight groups for vision and other characteristics can be found in Table 1.

(Insert Table 1)

Experimental Design: A treatments x treatments x levels design was used (3, p.121). The treatments consisted of comparisons of type size and type face. Two visual levels were employed: a. Legally blind children and b. children with visual handicaps less severe than legal blindness.

Variables studied: The experimental type (X Type) was compared with a type face in common use -- Antique with Old Style (C Type). The X Type was a sans-serif type with two special characteristics: (a) If the width of the limb of a lower case letter is taken as a unit, most letters will be found to be 4 units wide and 5 units high and (b) spacing between letters within words is two units. A

TABLE 1

DESCRIPTIVE STATISTICS FOR COMPARATIVE AGE, INTELLIGENCE, GRADE, READING COMPREHENSION, AND VISUAL ACUITY OF THE GROUPS USED IN THE STUDY.

		GROUPS			
		18 C	18 X	24 C	24 X
AGE					
Blind	Mean	13.31	13.03	13.55	13.04
	S.D.	2.41	2.24	2.14	2.41
Non-Blind	Mean	12.75	12.80	12.64	12.66
	S.D.	2.34	2.12	2.19	2.27
I.Q.					
Blind	Mean	99.60	99.10	98.93	97.89
	S.D.	22.35	14.24	15.32	12.26
Non-Blind	Mean	105.47	96.76	99.79	99.36
	S.D.	17.95	12.40	18.91	15.41
GRADE					
Blind	Mean	7.15	6.39	6.55	6.21
	S.D.	2.31	2.24	1.91	2.30
Non-Blind	Mean	6.33	6.12	5.97	6.21
	S.D.	2.02	1.80	1.62	2.05
READING COMPREHENSION					
Blind	Mean	79.76	83.70	84.21	83.15
	S.D.	30.16	19.90	19.22	22.64
Non-Blind	Mean	89.06	89.55	85.49	88.97
	S.D.	23.10	11.84	22.56	15.79
VISUAL ACUITY					
	Blind Median	20/200	20/200	20/200	20/200
	Non-Blind Median	20/70	20/80	20/70	20/80

TABLE 2

MEANS FOR GROUPS OF CHILDREN READING TYPE OF FOUR DIFFERENT CHARACTERISTICS

GROUP MEANS (N = 33)

	Type	Type Size 18 pt.	 24 pt.	Type Size 18 pt.	 24 pt.
		Paragraphs Read		Paragraphs Read Adjusted for Group Differences in Comprehension	
Legally Blind	C	31.51	31.90	33.85	31.42
	X	30.78	27.81	29.31	27.81
Not Legally Blind	C	42.21	36.93	42.94	37.09
	X	34.33	33.24	32.66	31.81

TABLE 3

RESULTS OF ANALYSIS OF COVARIANCE FOR GROUP MEAN READING SPEEDS.

Source of Variance	Sums of Squares*			df	Reduced Mean Square	F**
	Y	XY	X		Y	
Type	1108	-1504	2041	1	2645	10.88
Size	330	9	0	1	332	
Visual Level	2516	698	193	1	1969	8.07
Type x Size	3	-27	268	1	71	
Type x Visual Level	189	-30	5	1	216	
Size x Visual Level	59	31	16	1	36	
T x S x V.L.	235	248	265	1	74	
Error	82914	49398	119494	256	244	

* Y - reading speed, X - comprehension score; XY - products

** The F-ratios reported are significant beyond the .5% level of confidence. No other F-ratios were statistically significant.

commercially available type -- metrolite medium -- closely approximated these standards and was used for the purposes of this study. The type sizes compared were 18-point and 24-point.

Criterion measure: Reading speed was selected as the criterion for the study. The measure of this criterion was a test composed of Forms 1, 2 and 4 of Test Type A of the 1942 edition of the Gates Basic Reading Test, Grades 3-8. This composite test consisted of seventy-two paragraphs of approximately ninety words each. The subjects' task was to read each paragraph and answer a short question concerning it by underlining one of five choice words. Therefore, a comprehension measure as well as a speed score was available for each child.

The test was linotyped in both type faces in 18-point. It was then reproduced in both types in both 18- and 24-point through the photo-offset process. Tests in 18-point were set with 12-point leading, which was proportionately increased for the 24-point tests. Line length for all tests was set at 8.5 inches.

Test procedure: Time for the tests was set at 30 minutes. All testing was conducted by two examiners who visited the schools. Children were usually tested in a special room set aside for this purpose, although on a few occasions it was necessary to test them in their classrooms with other children present.

RESULTS:

While the method adopted for assigning subjects to groups tended to equate the eight groups of the study for all extraneous variables, further control was desirable. Since the test provided a reading comprehension score for each subject, it was possible to statistically equate the groups on this variable through application of analysis of covariance (3, p. 317).

(Insert Table 2)

Table 2 presents the mean number of paragraphs read by the group before and after adjustment was made for group differences in reading comprehension. Re-

sults of analysis of covariance of these data are presented in Table 3. The analysis of covariance reveals that differences significant at greater than the .5% level of confidence exists between the reading speeds for type and visual levels. No significant effect on reading speed can be attributed to the other variable, type size, or to any of the interactions.

(Insert Table 3)

DISCUSSION:

Examination of the adjusted means on Table 2 reveals that in every case visually handicapped children were able to read the control type faster than the experimental type. While it is not possible to determine the reason for these differences from this study, it is suggested that the greater line length resulting from use of the X type is a major cause.

When the adjusted group means for type size are compared, in every case 18-point is read faster than 24-point. However, our analysis shows that these differences are too small to be statistically significant. Therefore, the conclusion to be drawn from the data is that the groups of visually handicapped children studied could read both types with equal speed.

As could be expected, the groups with better vision read faster than those with poorer vision. Mean number of paragraphs read by legally blind children was 30.85 as compared with 36.32 for non-legally blind children. These means, when converted to words-per-minute, are 91.10 wpm for legally blind children and 105.93 wpm for non-legally blind children. These means somewhat underestimate actual reading rates because of inclusion of the reading comprehension task in the test.

SUMMARY:

Two-hundred-sixty-four large type readers, ages 8 years 9 months to 20 years 10 months, and grades 4 through 12 were utilized in a study of type characteristics

using a treatments x treatments x levels design. Findings were that both legally blind and non-legally blind groups read 18-point type as rapidly as 24-point type, and that a common textbook type was read more rapidly than an experimental type.

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